

Online Calibrations

Bill Orejudos, LBNL

Jan 16, 2002

Overview

- It is the responsibility of the DAQ ace to run online calibrations once per day.
- “Online calibration”
 - Ace initiates some kind of “pulsing” for system
 - The “data” from the pulse is read out from the Front End Readout crates
 - “Data” used to form calibration constants, which are used to correct the data.

Offline vs Online calibration

- This differs from “offline calibrations”, in which real data from collisions are used to find constants.
 - Systems need offline and online calibrations for different types of constants
 - Aces only responsible for the online calibration.

X-mode vs D-mode

- X-mode: FER crate processes data forms constants, forms a calibration bank, sends calibration bank to consumer, consumer writes to DB
 - COT calibration
 - Calorimeter calibrations
- D-mode: Data sent from FER crate to consumer, consumer processes data, forms constants, writes to DB.
 - Silicon

Hardware vs Software EVB

- Standard data taking is done with the Hardware Event Builder.
- All the online calibrations are done with the Software Event Builder
 - Software EVB connects to Consumer Server/Logger
 - CSL connects to the Calibration Consumer

Pulsing

- Generally, it is not the detector itself which gets “pulsed”, but its readout electronics:
 - Calorimeter:
 - QIE: Charge injected into QIE
 - LED/Xenon: Light into Phototubes
 - COT: Charge injected into ASDQ readout card
- Exception: Calorimeter source runs. But you’ll never do these!!!

List Of Calibs

- Calorimeter
 - Qie (CEM,CHA,PEM,PHA,WHA)
 - LED (CEM)
 - Xenon (CEM)
 - Laser (Plug)
 - No consumer yet – expert reads D-banks from disk
- CLC: Qie
- COT: CotCtt
- Muons
 - No consumer yet, expert reads D-bank from disk

Calibs (continued)

- Shower max (central, plug)
- TOF
 - Qie (to calibrate pulse heights)
 - TAC
 - To calibrate timing
 - No consumer yet, expert reads D-banks from disk
- Silicon
 - Two runs needed: DPS on (pedestals), DPS off (noise)
 - Currently D-mode: X-mode calibrations coming soon

Running Calibrations

- Mostly consists of choosing correct run configuration, going through state transitions
- Will give example here for COT and QIE
- Other calibs, see Ace help:

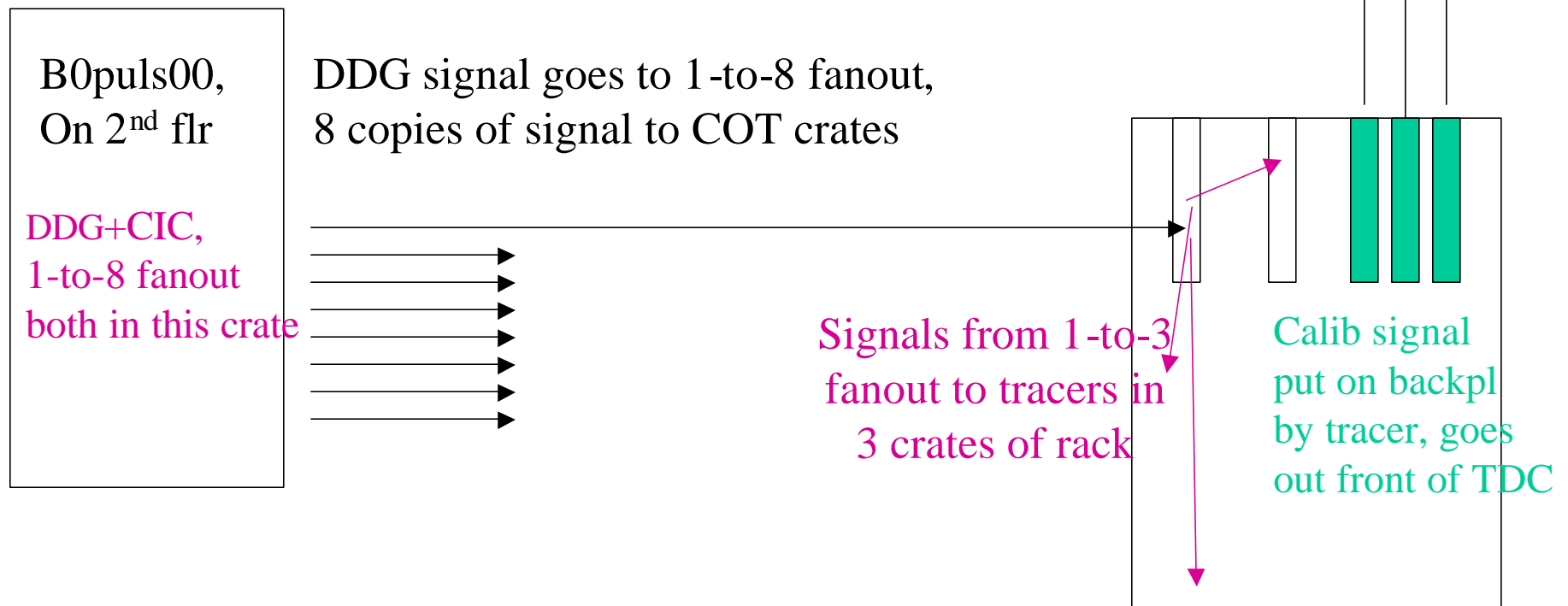
www-b0.fnal.gov:8000/ace2help/ace_calibrations.html

Picture of COT Calib Path

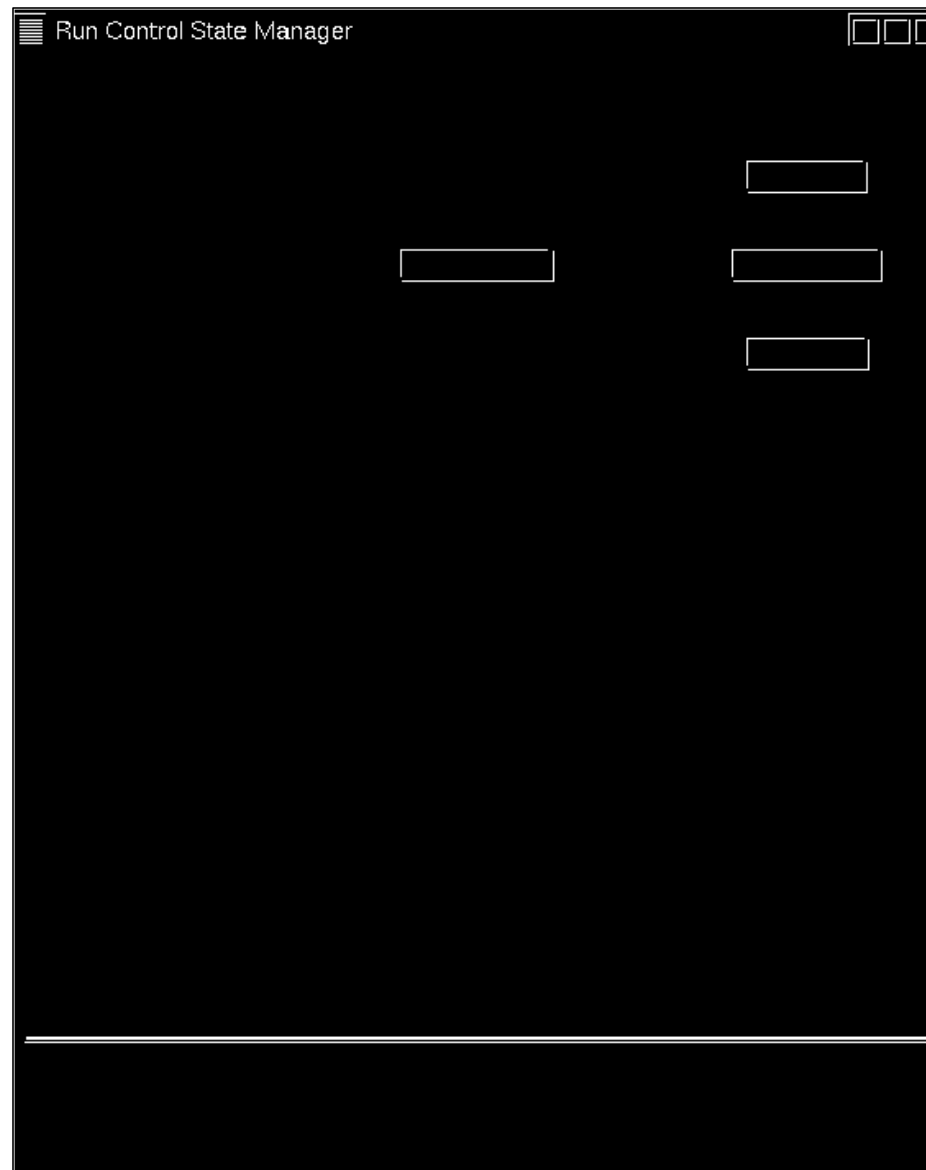
ACE initiates Calibration:

Signal from TS goes to tracer, picked up by CIC (6-to-9 U adapter) which triggers DDG through front panel

Calib signal goes down flat cable/repeater/micro-coax to ASDQ, fires special circuitry on ASDQ which injects charge into readout part of ASDQ, “data” read out thru normal path of micro-coax/repeater/flat cable/TDC



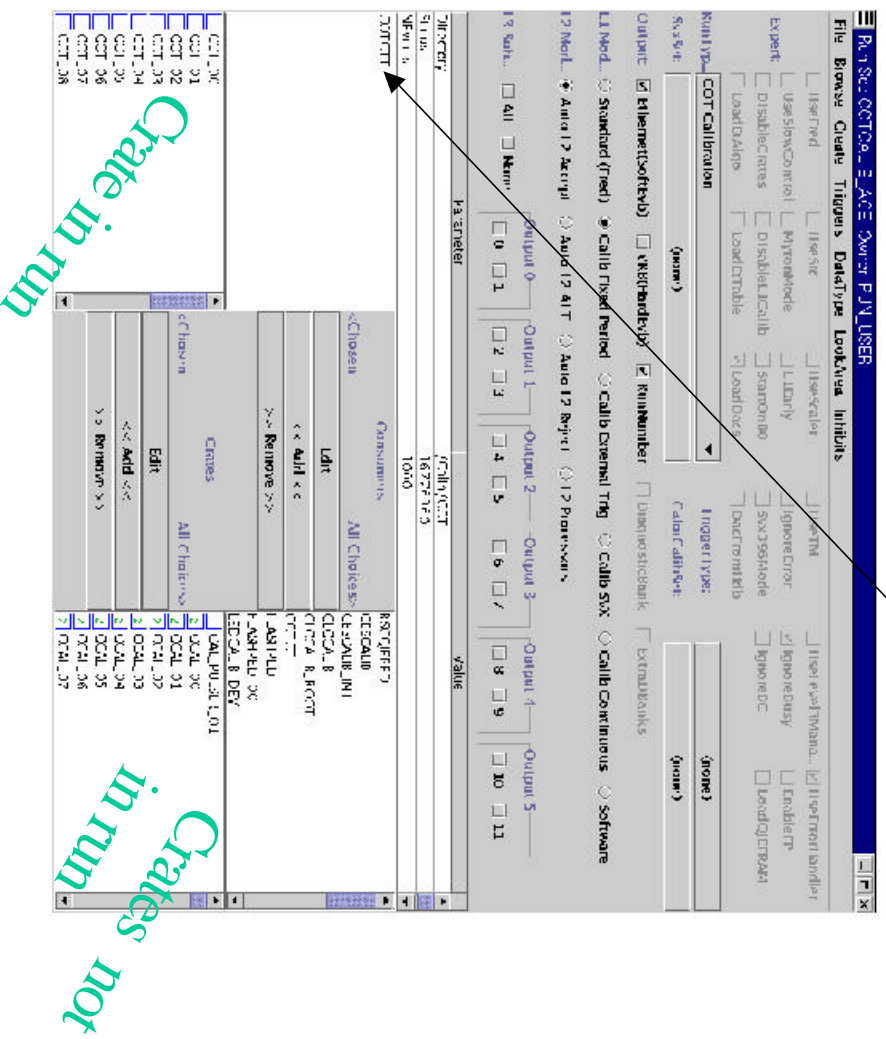
Picture of Calib GUI (COT)



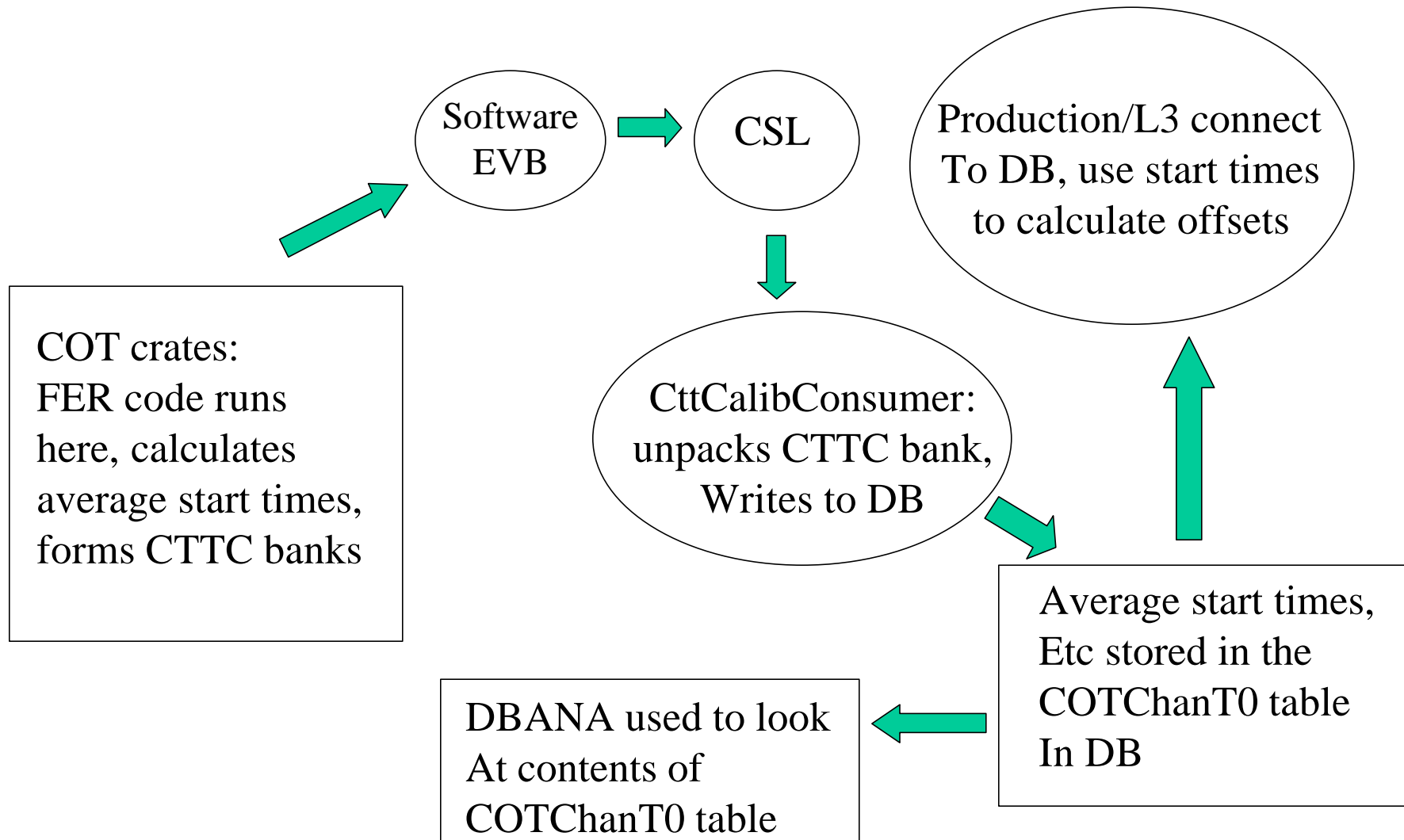
How to run calibration (COT)

- Start run control
- Select generic calibration
- Chose a partition
- Select run config:
 - `calib:cot:COTCALIB_ACE`
- Do Partition:setup:activate. This is what fires the pulser!
- Calibration will take a minute or so. After pulsing is done, CTTC bank formed and sent to SEVB, then to consumer. Will take consumer another minute or so to write data to COTChanT0 table.

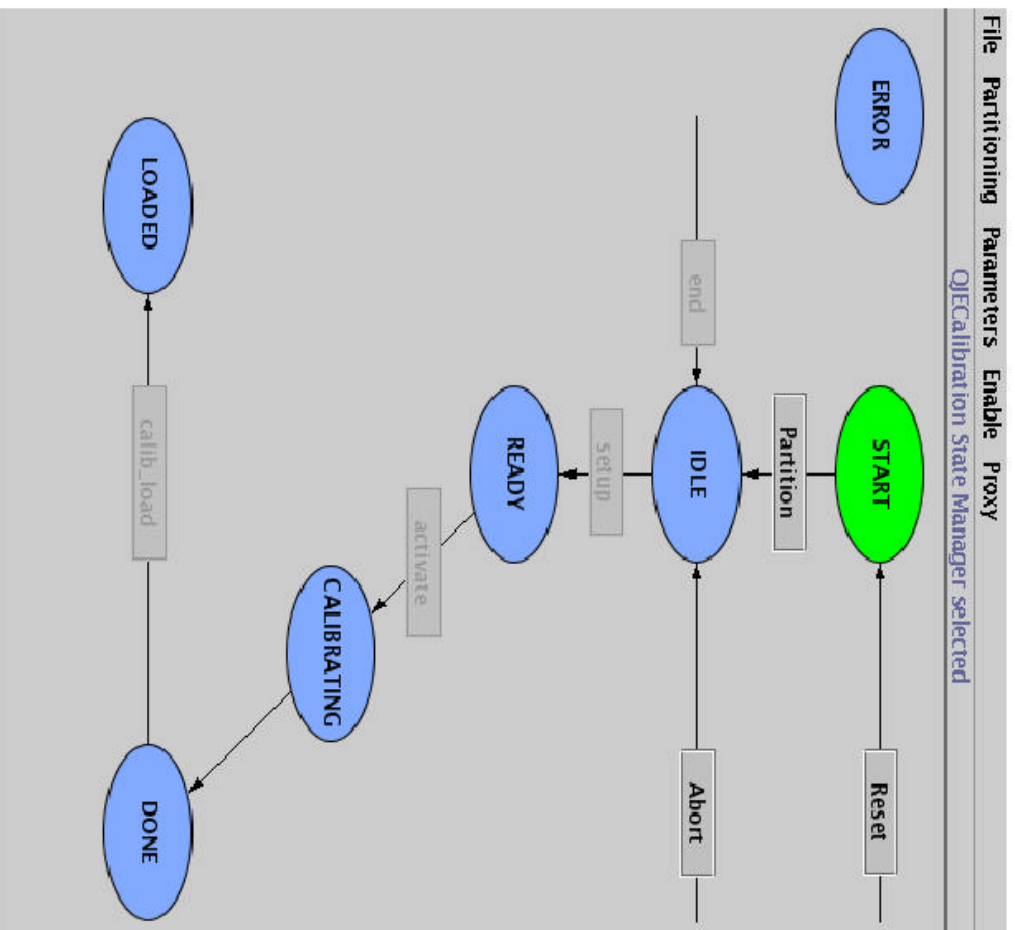
COT calib
consumer



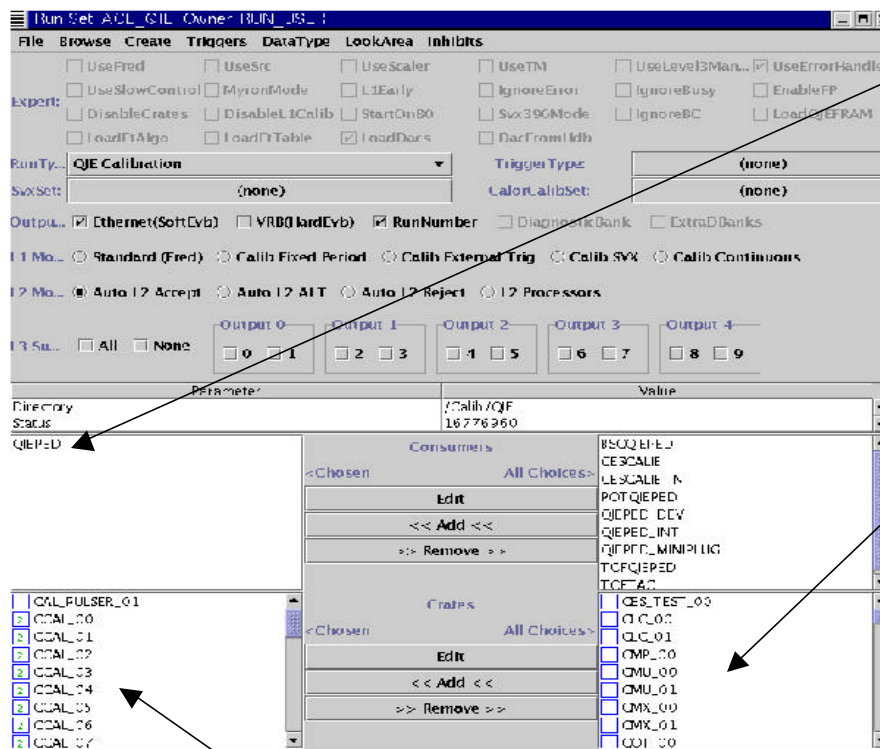
Picture of Calibration chain (COT)



QIE calibration GUI



Config for QIE calib



Qie calib consumer

Crates not in run

Crates in run

Where are constants applied?

- COT: constants read from database and applied at L3/offline
- Calorimeter:
 - QIE: constants applied in the readout electronics
 - Run control has extra button, “download”
 - You’ll rarely (**never**) use this
- Muons: Just used for expert checks

Checking Calibrations

- Use DBANA to verify calibration made it into database
 - Setup cdfsoftb0
 - DBANA
- Should see the calibration run listed
- Note: COT calibration only writes new COMPLETE run if the new calibration changes from last COMPLETE run
 - Otherwise, just writes the BAD channels

Calibration Tables

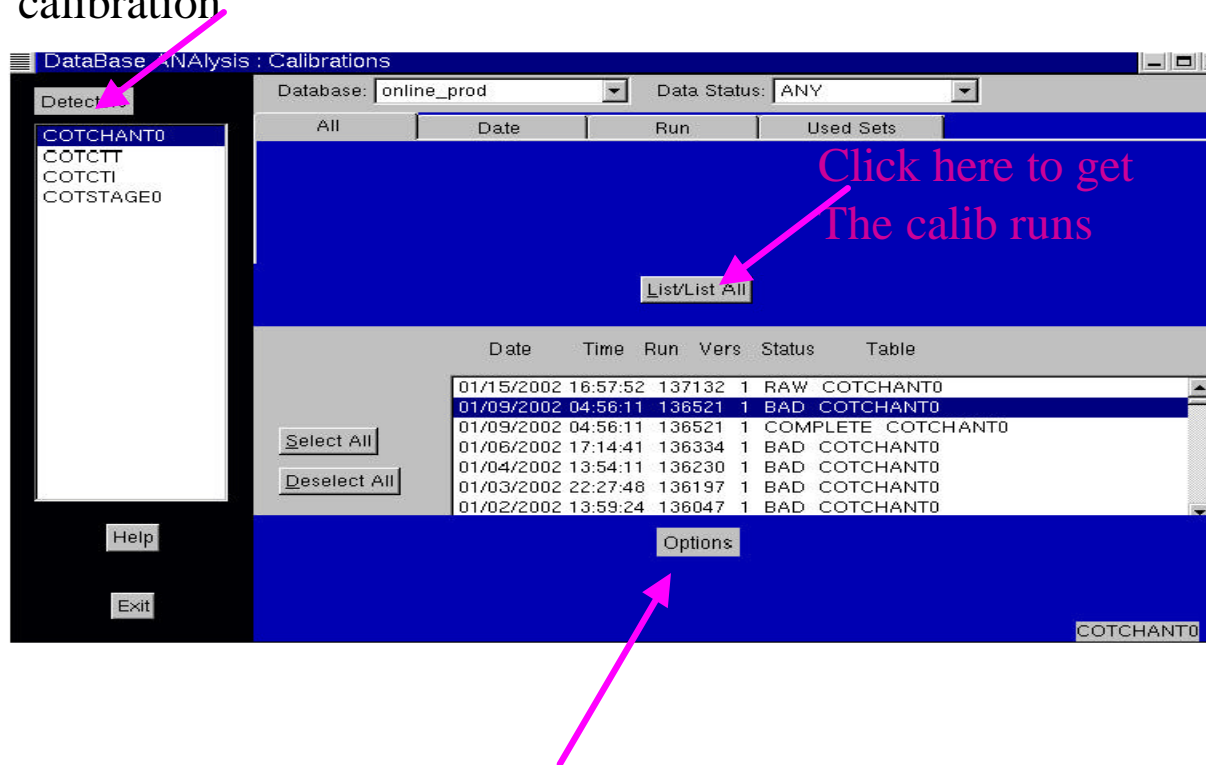
- From Qie calibration:
 - CEMQIE2, CHAQIE2, PEMQIE2, PHAQIE2, WHAQIE2, CEMPED, CHAPED, PEMPED, PHAPED, WHAPED
- From LED: CEMLED
- From Xenon: CEMXEF
- From Plug Laser: PHALASER

Calibration Tables (cont)

- From CLC:
 - CLACQIE, CLAPED
- From COT: COTChanT0
- From ShowerMax:
 - CESQIE2, CPRQIE2, CCRQIE2, PESQIE2, PPRQIE2, PESQIE2, CESPED, CPRPED, CCRPED, PESPED, PPRPED
- From TOF:
 - TOFQIE, TOFQIEPED
- Silicon tables not listed here

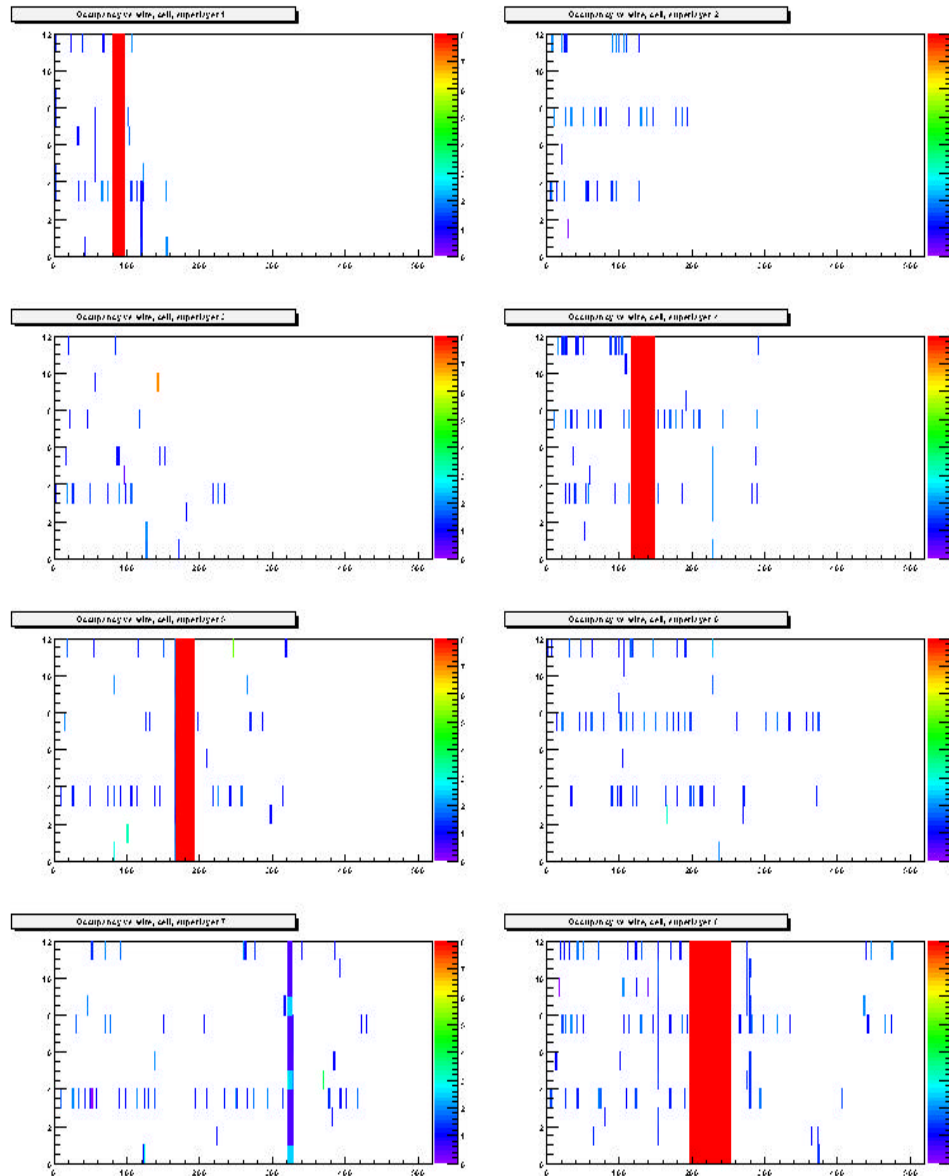
DBANA

Click on “Detectors” for
specific detector, click on that
detector to get the tables from the
calibration



For more example
From more detectors
See the ACE calib
Help page

This will give list of options for plots



Plot of COT occupancy by superlayer, for the bad channels. Occupancy Should be 1 for each channel for the calibration

TroubleShooting

- Persistent problem with crate (calibration fails during run)
 - Call expert
 - If there is a problem with a crate, probably already showed up during the data taking
- Calibration does not show up in the database
 - Check log file on b0dap30: ~cdfdaq/consumers/log (do `ls -ltr` to check for latest log file. Will have name such as “runCotCtt_1*****.log”)
 - Record any errors in e-log, send email to expert.